

Persistence of a dark form of Madagascar Magpie Robin *Copsychus albospectularis* in central-east Madagascar

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Persistance d'une forme sombre du Shama de Madagascar *Copsychus albospectularis* au centre-est de Madagascar. Le Shama de Madagascar *Copsychus albospectularis* est généralement considéré comme comprenant trois sous-espèces : *C. a. albospectularis* (Madagascar du nord-est) a le ventre noir et la queue entièrement noire, *C. a. inexpectatus* (du centre-est au sud-est de Madagascar) a le ventre blanchâtre, la poitrine noire et la queue entièrement noire, et *C. a. pica* (Madagascar de l'ouest au nord) ressemble à *C. a. inexpectatus* mais est plus grand et le blanc du ventre s'étend davantage vers la poitrine, tandis que les rectrices externes sont blanches. À Maromizaha, près d'Andasibe, au centre-est de Madagascar, 5,5% des Shamas de Madagascar *C. a. inexpectatus* capturés étaient sombres, ressemblant à la sous-espèce nominale pour certains traits morphologiques, mais pas tous. Le plumage d'un individu capturé deux fois en trois ans n'avait pas changé. Les mensurations des oiseaux sombres rentrent bien dans celles de *C. a. inexpectatus*.

Summary. Madagascar Magpie Robin *Copsychus albospectularis* is generally considered to comprise three subspecies: nominate *C. a. albospectularis* (north-east Madagascar) has a black belly and all-black tail, *C. a. inexpectatus* (east-central to south-east Madagascar) has a whitish belly, black breast and all-black tail, and *C. a. pica* (western and northern Madagascar) is similar to *C. a. inexpectatus* but larger, while the white on the belly extends more towards the breast and the outer tail feathers are white. At Maromizaha, near Andasibe, in central-east Madagascar, 5.5% of Madagascar Magpie Robins *C. a. inexpectatus* mist-netted were dark, resembling the nominate subspecies in some but not all morphological aspects. One individual was caught again after three years and its plumage was unchanged. Measurements of dark birds were well within the range of *C. a. inexpectatus*.

The genus *Copsychus* (Turdidae) occurs mostly in Asia (Collar 2005) from where it has successfully spread to the south-west Indian Ocean, on Seychelles and Madagascar (Sheldon *et al.* 2009). In Madagascar, three subspecies of Madagascar Magpie Robin *Copsychus albospectularis* (Eydoux & Gervais, 1836) are currently recognised (Morris & Hawkins 1998, Sinclair & Langrand 1998): the nominate (north-east Madagascar), *C. a. inexpectatus* Richmond, 1897 (east-central to south-east Madagascar), *C. a. pica* Pelzeln, 1858 (western and northern Madagascar) and possibly a fourth, *C. a. winterbottomi* Farkas, 1972, which according to some authors is a synonym of *C. a. inexpectatus*.

During mist-netting work at Maromizaha (18°95'S 48°47'E), Andasibe (Perinet), central-east Madagascar in 2003 (20 September–20 October), 2004 (29 October–27 November), 2005 (19 November–27 December), 2006 (25 November–11 January) and 2007 (26 November–17 December), 26 male *C. albospectularis* were caught that mostly resembled *C. a. inexpectatus* with a whitish belly clearly separated from the black breast, all-black tertials and an all-black tail

(Morris & Hawkins 1998). The greater and median coverts were mostly black, although the innermost did show some white, and were thus intermediate between *C. a. inexpectatus* and *C. a. pica*. Two males (5.5% of the total number of males trapped) differed from the rest in showing a very black belly with only a few white feathers on the posterior half, and thus resembled the nominate form but differed in having a white spot on one of the tail feathers (Fig. 1). Differences in plumage characteristics between the different subspecies are summarised in Table 1.

Prior to release, the birds were ringed (with rings provided by SAFRING, Cape Town, South Africa), and measurements and photographs taken. Results are presented in Table 2. Measurements of the two dark individuals were well within the range of the other magpie robins caught at Maromizaha. Two-tailed T-tests were used to test for differences between the sexes. Males had longer wings, eighth primaries, skulls and tails. There was no overlap in tail measurements between the sexes, with males having a significantly longer tail.

Recapture rates in subsequent years were 8.3% for males ($n=26$) and 10% for females ($n=10$).

Table 1. Differences between subspecies of Madagascar Magpie Robin *Copsychus albospecularis*, as expressed in males (based on my own field data, specimens at the Muséum national d'Histoire naturelle (MNHN) Paris, supplemented with information in Eydoux & Gervais 1836, Pelzeln 1858, Richmond 1897, Farkas 1972, Morris & Hawkins 1998, and Sinclair & Langrand 1998).

Tableau 1. Différences entre les mâles des sous-espèces du Shama de Madagascar *Copsychus albospecularis* (basé sur mes propres données de terrain, des spécimens du Muséum national d'Histoire naturelle (MNHN) Paris, et des informations dans Eydoux & Gervais 1836, Pelzeln 1858, Richmond 1897, Farkas 1972, Morris & Hawkins 1998, et Sinclair & Langrand 1998).

Subspecies	Belly	Undertail-coverts	Tertials	Greater coverts	Tail feathers	Range
<i>C. a. albospecularis</i>	Black, some with pale brown / whitish- to reddish-brown tips of varying extent	Black, in fresh plumage with white or reddish tips	Black	Outer black, inner 4–6 white or mix of black and white, sometimes only outer vanes white and inner ones black (5/6)	Black	North / eastern humid forests
<i>C. a. inexpectatus</i> (e.g. at Maromizaha)	Whitish, less than <i>pica</i>	Pure white with black base underneath	Black, rarely outer edge spotted white (Ivohibe)	Outer three black and innermost white with inner fringes of greater coverts 5 and 6 partially black	Black	East / central to south-east
<i>C. a. pica</i>	White	White with black base underneath	From completely black to some with white outer fringes	Extent of white broadest of all subspecies, also extending to median coverts	Outermost two white, outer fringes white	West, north, south
<i>C. a. winterbottomi</i>	White	White	Outer fringes white	White	Black with white spots on three outermost	Ihosa
Maromizaha dark form	Black, few feathers with white tips or shafts	Black with white to reddish fringes, extent depending on feather wear	Black	Outer ones black, inner ones either have broad white tips or are entirely white, some as in <i>inexpectatus</i>	With white tips or entirely black	East / central to south-east

Retrapped birds exhibited high site fidelity during the breeding season and were trapped in the same net or adjacent ones (<100 m distant) in subsequent years. The adult dark-bellied male ringed on 4 October 2003 (ring no. FA47345) was recaptured at the same site close to my base camp on 15 December 2006. On both occasions the bird had a well-developed cloacal protuberance, being reproductively active.

Although my data are limited, it appears that the dark form of the magpie robin at Maromizaha is a persistent phenomenon in a region where white-bellied *C. a. inexpectatus* is usually found (Fig. 1). The recapture of FA47345 three years later revealed that the plumage coloration of this bird remained the same including the presence of a small white spot on the fifth rectrix (the second outermost) on the left.

The occurrence of a dark form in this region has been known for some time, e.g. Langrand (1990) states 'Individuals with characters intermediate between the subspecies *C. a. albospecularis* and *C. a. inexpectatus* ... are found locally'. Among specimens of Madagascar Magpie Robins at the

Muséum national d'Histoire naturelle (MNHN), Paris, two dark forms were collected in 1929 at Sianaka Forest (Fig. 2) which probably refers to the Sihanaka Forest (18°41'S 48°75'E) west of Tamatave and east of Lake Alaotra in the corridor between Mantadia and Zahamena national parks. Delacour (1931) described much variation in magpie robins at this site and nearby Fanovana (18°92'S 48°57'E) with seven of 16 males collected having a white belly, seven having a black belly and two having a white belly and white on the three outermost rectrices (both sides). Unfortunately, Delacour (1931) did not provide exact localities for the latter two birds. He speculated them to be some form of *C. a. pica*. Anecdotal evidence of dark-bellied forms as described for Maromizaha has also been reported by bird guides working in the region of Andasibe and a dark form was observed by me as far south as Ranomafana National Park (in the district of Fiarantsoa, 20°52'S 46°77'E). Stresemann (1926) mentioned an individual from Fenoarivo Atsinanana (18°92'S 48°57'E), on the east coast just south of île St. Marie) that resembled *C. a.*

Table 2. Measurements of adult male and female Madagascar Magpie Robins *Copsychus albospecularis* from Maromizaha (two males of dark form at right), with results of a two-tailed T-test between males and females shown. Males had longer wings, eighth primaries, skulls and tails than females.

Wing: max. chord (Svensson 1992); eighth primary (=third primary in Svensson 1992); tarsus: metatarsal bone or 'minimum' tarsus (Redfern & Clark 2001); Kipp measure: distance between the tip of the first secondary and the tip of the wing (Baldwin 1931, Berthold & Friedrich 1979); DT: distance between the tip of the outermost primary and the tip of the wing (Leisler & Winkler 1991).

Tableau 2. Mesurations de mâles et femelles adultes du Shama de Madagascar *Copsychus albospecularis* de Maromizaha (deux mâles de la forme sombre à droite), avec les résultats du test bilatéral de Student entre mâles et femelles. Les mâles avaient les ailes, la huitième rémige primaire, le crâne et la queue plus longs que les femelles.

Aile : longueur maximale (Svensson 1992) ; huitième rémige primaire (=troisième rémige primaire in Svensson 1992) ; tarsus : metatarses (Redfern & Clark 2001) ; mesure Kipp : distance entre le bout de la première rémige secondaire et le bout de l'aile (Baldwin 1931, Berthold & Friedrich 1979) ; DT : distance entre le bout de la rémige primaire la plus à l'extérieur et le bout de l'aile (Leisler & Winkler 1991).

Variable	Mean		Standard Error		Sample size		Differences between males and females*			Dark-bellied males (n=2)	
	males	females	males	females	males	females	T=	P=	Df=	Mean	Standard Error
Wing	77.39 (73.5–81.5)	74.05 (72.0–76.0)	0.42	0.48	22	10	4.8	0.000	30	79.0 (78.5–79.5)	0.5
Eighth primary	56.72 (53.5–60.5)	54.19 (53.0–56.5)	0.41	0.43	20	8	3.63	0.001	26	58.0	*
Tarsus	26.1 (24.6–26.9)	25.75 (24.3–26.8)	0.12	0.23	24	10	1.48	0.148	32	26.2 (25.5–26.9)	0.7
Mass	23.97 (21.9–26.3)	24.59 (20.2–28.6)	0.22	0.98	23	8	-0.92	0.365	29	24.6 (23.6–25.6)	1.0
Tip of bill to nostrils	10.17 (9.1–11.6)	10.29 (9.5–11.4)	0.12	0.18	23	9	-0.52	0.605	30	9.9 (9.8–10.0)	0.1
Height of bill at nostrils	4.49 (4.1–4.8)	4.41 (4.1–4.8)	0.03	0.06	24	10	1.26	0.216	32	4.75 (4.7–4.8)	0.05
Width of bill at nostrils	4.22 (3.8–5.0)	4.22 (3.9–4.8)	0.07	0.08	24	10	0.01	0.994	32	4.2	*
Skull	18.19 (17.0–19.4)	17.43 (16.4–18.4)	0.13	0.24	23	10	3.06	0.004	31	18.2 (17.9–18.5)	0.3
Tail	72.5 (67.5–79.0)	64.25 (63.0–66.0)	0.95	0.63	12	4	4.81	0.000	14	72.5	*
Kipp	11.37 (10.2–12.8)	12.32 (10.3–14.0)	0.22	0.68	15	5	-1.79	0.090	18	12.15 (11.5–12.8)	0.65
DT	36.12 (26.0–58.0)	40.45 (27.2–49.0)	2.28	3.50	15	6	-1.02	0.319	19	32.25 (31.2–33.0)	0.75

* Two-tailed t-test: T = T-value; P = Probability; Df = Degrees of freedom.

albospecularis but had some white tail spots and white undertail-coverts with black marks thus displaying some *C. a. pica* characters. Delacour (1931) mentioned an *inexpectatus* type with small white spots towards the tips of the tail

feathers (but which lacked the black belly that the two Maromizaha birds possessed). In summary, considerable phenotypic variation appears to exist in central-east Madagascar.



Figure 1. Madagascar Magpie Robins *Copsychus albospectus inexpectatus* trapped at Maromizaha, Madagascar. Column 1: the predominant phenotype in this region. Column 2: an individual of the dark form (FA47345) in 2003. Column 3: the same bird (FA47345) in 2006 (Friederike Woog)

Shamas de Madagascar *Copsychus albospectus inexpectatus* capturés à Maromizaha, Madagascar. Première colonne : le phénotype prédominant dans cette région. Deuxième colonne : un individu de la forme sombre (FA47345) en 2003. Troisième colonne : le même oiseau (FA47345) en 2006 (Friederike Woog)



Figure 2. Specimens of Madagascar Magpie Robin *Copsychus albospecularis inexpectatus* held at the Muséum national d'Histoire naturelle (MNHN) Paris, a (CG1964-1109) and b (CG1964-1108) from Périnet (910 m, 15 November 1958, coll. C. W. Benson), c–h from Sianaka Forest, October 1929, Mission Franco-Anglo-Américaine, coll. P. Milon, c (CG1974-364), d (CG2005-2239), e (CG1932-1918), f (CG1974-361), g (CG1932-1901); f and g represent dark forms similar to those described from Maromizaha (Friederike Woog)

Spécimens du Shama de Madagascar *Copsychus albospecularis inexpectatus* du Muséum national d'Histoire naturelle (MNHN) Paris, a (CG1964-1109) et b (CG1964-1108) de Périnet (910 m, 15 novembre 1958, coll. C. W. Benson), c–h de la forêt de Sianaka, octobre 1929, Mission Franco-Anglo-Américaine, coll. P. Milon, c (CG1974-364), d (CG2005-2239), e (CG1932-1918), f (CG1974-361), g (CG1932-1901) ; f et g représentent des formes sombres ressemblant à celles décrites de Maromizaha (Friederike Woog)

The reasons for this variation have been debated. My recapture supports Stresemann's (1926) assumption that such variation is not age-related, as the bird's plumage was identical after three years. But is the dark form observed at Maromizaha simply a morph of *C. a. inexpectatus* or a hybrid between *C. a. inexpectatus* and *C. a. albospecularis*?

Stresemann (1926) did not even afford *albospecularis* taxonomic status, preferring to consider such individuals as melanistic morphs of *C. pica*. In contrast, Delacour (1931) recognised two subspecies, *C. a. albospecularis* (in the humid east) and *C. a. pica* (over the rest of the island) and postulated the existence of a hybrid zone between them extending from Fanovana to Andapa (excluding the Masoala Peninsula). Similarly,

in Indonesia, white-bellied subspecies of the Oriental Magpie Robin appear to hybridise with black-bellied subspecies: on Java, white-bellied *Copsychus s. musicus* is distributed in the west and the black-bellied *C. s. amoenus* in the east, with a contact zone between them and, similarly, on Borneo white-bellied *C. s. musicus* occurs in the west, and the black-bellied *C. s. adamsi* and *C. s. pluto* in the east (Sheldon *et al.* 2009).

The situation in Madagascar may be comparable, and the dark birds in the range of *C. a. inexpectatus* may signal a rather extended zone of intergradation between the subspecies (see also Collar 2005). Within such a zone, however, one should always find both parents of the intergrade, i.e. at Maromizaha in addition to *inexpectatus*, one would also expect to find some individuals

of *albospecularis* which, however, I never found, although this could be explained by their rarity. Alternatively, the dark forms observed within a region otherwise occupied by *C. a. inexpectatus* might indeed represent a morph. To answer these questions, more detailed information about the frequencies in which the various subspecies of *C. albospecularis* and other apparently mixed phenotypes occur in the east of the island is needed, on north–south and east–west gradients. In sum, a detailed study of the phylogeography of the genus in Madagascar is needed because, at present, our understanding of the clearly complex morphological variation observed is rather poor, and the mechanisms driving these differences rather unclear.

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